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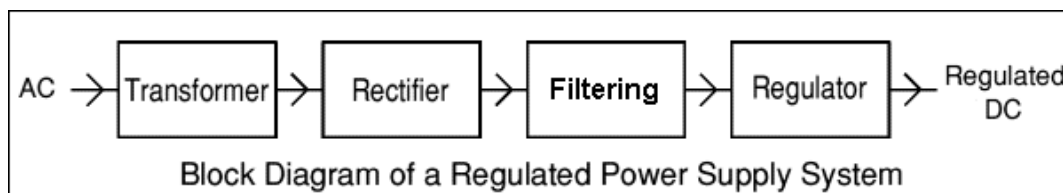


Figure 1

Tricks and Tips for the LM78XX Series Voltage Regulators

by Lewis Loflin

In this section we will explore fixed, regulated power supplies. We will make use of the 78XX and 79XX series of voltage regulators. They are made by several manufacturers, most are readily available, and are inexpensive. In [Basic Power Supply Rectification Tutorial](#) we already discussed the process from AC in to filtering. Later we will examine adjustable, regulated power supplies.

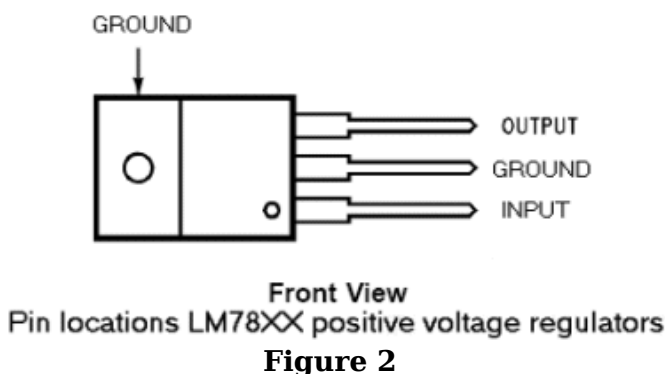
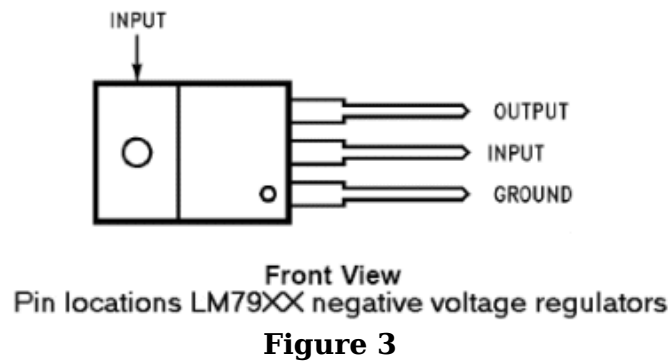


Figure 2

The LM78XX series of three terminal positive regulators are available in the TO-220 package. Each type employs internal current limiting, thermal shut down and safe operating area protection, making it essentially indestructible. If adequate heat sinking is provided, they can deliver over 1A output current. These devices can be used with external components to obtain adjustable voltages and currents. Available output voltages: 5, 6, 8, 9, 10, 12, 15, 18, and 24V. Figure 2 shows the electrical connection for the LM78XX series.



The LM79XX series of 3-terminal regulators is available with fixed output voltages of -5V, -12V, and -15V. These devices need only a compensation capacitor (1 μF solid tantalum or 25 μF aluminum electrolytic) at the output. The LM79XX series is packaged in the TO-220 power package and is capable of supplying 1.5A of output current with proper heat sinking. Like the LM78XX series they employ internal current limiting safe area protection and thermal shutdown for protection against virtually all overload conditions. Figure 3 shows the electrical connections on the LM79XX series and how they differ from the LM78XX series.

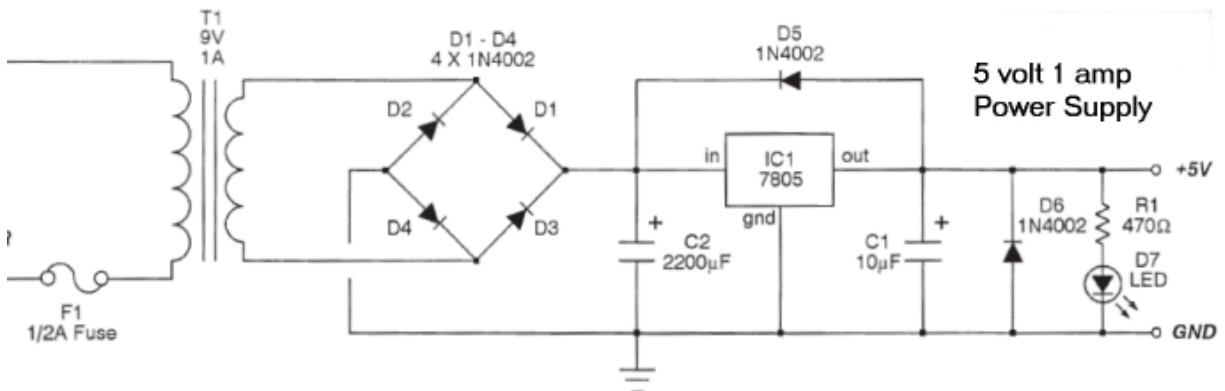
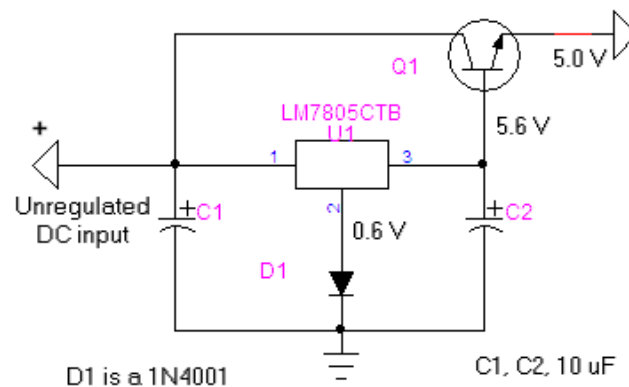


Figure 4 shows a basic 5 volt general purpose power supply. Any of the other positive regulators will work the same way as long as one observes proper input voltage levels and component ratings.



In figure 5 we have added a NPN pass transistor such as a 2N3055 to boost output current to several amps. Diode D1 was added to compensate for the voltage drop across the base-emitter junction of Q1.

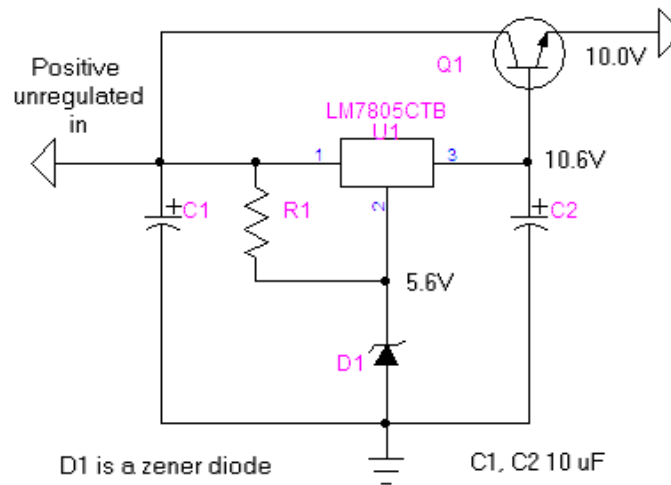


Figure 6

In figure 6 we have added a 5.6 volt zener diode for D1. By using zeners we can produce any number of odd voltage requirements. Q1 works the same as in figure 5 or could be left out and a 5 volt zener used if current requirement is under 1 amp.

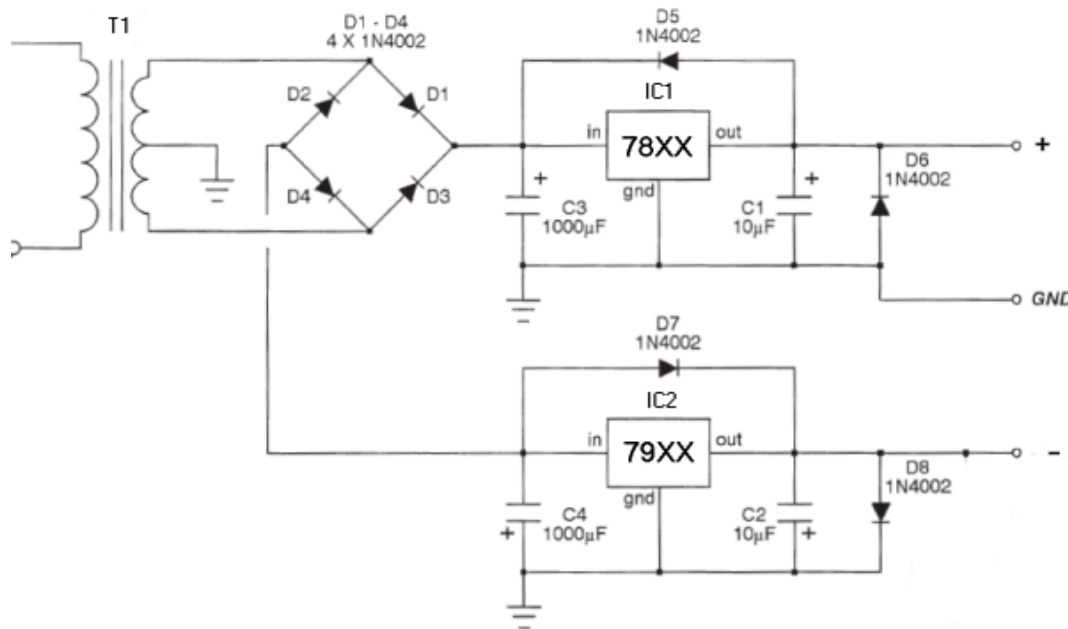


Figure 7

Figure 7 illustrates a regulated bi-polar power supply for use with OP-AMP circuits.